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Project Reward...And Campus Building.
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This report describes a project experiment, the goal being to improve the quality and efficiency of instruction at Rensselaer Polythechnic Institute. To that end it assembled a staff of professionals and technical people, established a broad spectrum of programs and services, and initiated a goal of educational innovation both of Rensselaer, and elsewhere. Some changes and advances brought about through the project concern class size, instructional technology, large group instruction, and a communications center. (FPO)

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Photographs by the Office of Institutional Research, RPI, and Diane Graham (photograph of the University of Sydney Control room, page 8).

PROJECT REWARD . . . AND CAMPUS BUILDING

In the mid-1950's a program dubbed "Project Reward" was initiated on the campus of Rensselaer Polytechnic Institute, a technological university in upstate Troy, New York.

The Project's stated goal was to improve the quality — and the efficiency—of instruction at Rensselaer. To that end it assembled a staff of professionals and technical people, it established a broad spectrum of programs and services, and it initiated a goal of educational innovation, both at RPI and elsewhere.

Project Reward was influential in another way, too. Working hand in hand with RPI's architectural research staff, it created some interesting and significant instructional facilities at Rensselaer.

"Project Reward" exists no longer. Conceived and operated as an experiment, it has been adjudged successful and has been completely welded into the university's ongoing educational programs.

Project Reward makes quite a story. It is a story of a small university's attempt to improve its program, and it is a story of partnership between educator and architect in achieving that goal.
This, then, is that story.

contents

the setting

Rensselaer Polytechnic Institute is an old (founded in 1824), private, and relatively small (5,500 students) university with a prestigious reputation in the fields of science and technology. In purpose and methods, RPI has been a leader in the education of men of high technical and scientific competence. In the 1800's, men of Rensselaer designed and built many of the railroads, bridges, highways, and canals that moved America westward and designed the processing, refining, and power plants that created her great industrial base.

In the twentieth century, RPI has evolved into a broader technological university. In addition to its traditional programs in science and engineering, it now offers major programs in architecture, management, and the humanities. The graduate school has grown to include nearly 2,000 students, and a research division co-ordinates 4.5 to 5 million dollars of research each year.

Located in Troy, New York, the main campus lies at the edge of a metropolitan region rich in scientific, industrial, and governmental resources. This "Capital District" includes over a half million people and supports a great diversity of institutions of higher education (including the State University of New York at Albany; Russell Sage College; Siena College; St. Rose College; Union University with its Union College and Colleges of Medicine, Pharmacy and Law; a fast growing two-year community college; and a number of smaller, special-purpose schools). Recognizing the value of inter-institutional co-operation, the schools offering graduate level programs have initiated co-operative programs within the Capital District, and graduate students may enroll and participate in courses in two or more institutions concurrently.

Students come to this setting from all over the United States and from Canada, South America, and the Near East. The highest percentage is from New York State, with the majority of them coming from the New York Metropolitan Area. Admittance is highly competitive; RPI students are bright and highly "success motivated."

The Challenges

As do many small, private universities, RPI faces a host of significant challenges, challenges which must be met and overcome if the school is to continue as a leader in its chosen fields.

THE CURRICULUM: The challenge to maintain curricular excellence at the small, private, technologically-oriented university is a tough one. Historically Rensselaer has risen to meet the challenge, however, and one of its first Directors, Benjamin Franklin Greene, is credited with developing the engineering curriculum which served as the model for engineering schools of his era.

But time and demands have changed since Greene's days, and the curricula and programs at the school are constantly undergoing changes as science and technology require the addition of new programs such as environmental engineering, the combining of older disciplines as in the case of biophysics, and the reorganization of traditional curricula such as has recently occurred in the School of Engineering. These changes in research and education become pacesetters for other schools in the country, but accommodating these changes in the instructional fabric is a constant challenge.

THE FACULTY: The faculty is undergoing change. In a relatively few years it has become noticeably younger, better educated (if academic degrees are a criterion) and better paid. At the same time, outside competition for the talents and energies of such a faculty has increased. Attracting and holding a vital faculty capable of meeting the demands of teaching, while still providing for research and professional development, is a major challenge.

THE PHYSICAL PLANT: It logically follows that the physical plant, a mixture of buildings spanning 60 years (disastrous fires wiped out major portions of the campus several times during the 1800's), represents a further challenge in terms of utilization, renovation, and new construction. Each new building project represents a major effort in fund raising and development. Allocations for physical plant must compete with the demand for higher faculty salaries, broader scholarship opportunities, and expanded facilities for research and professional development. Classrooms must compete for priority with laboratories, the library with the lecture hall center, and residences with a host of other physical needs.

Teaching methods have necessarily been largely dictated by an existing pattern of facilities and involve a mixture of classroom recitations, lectures, and laboratories. A continuing program of renovation has begun to provide for other needed facilities such as computer laboratories, case study rooms, seminar rooms, audio-visual classrooms, and language labs, but analyses of the utilization of existing facilities constantly point out the inadequacies of many aspects of the plant.

THE COSTS OF INSTRUCTION: Education at RPI is expensive; undergraduate tuition for a year is over the two-thousand-dollar mark, and if the costs of room, board, fees, supplies, and textbooks are included, the price of a year at Rensselaer is approaching four-thousand dollars. Without the large endowment seen in some Eastern schools and without legislative support, RPI must look to individual and corporate gifts, foundations and governmental grants, and a hundred other sources of support for its total program.

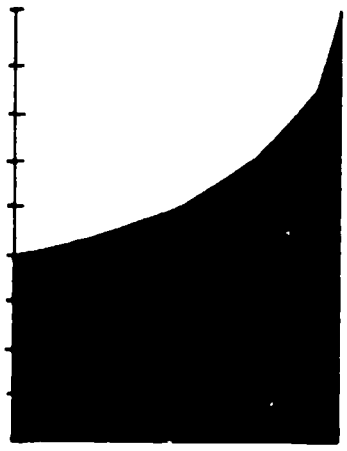
THE ENROLLMENT: RPI is typical of many private schools in that its enrollment is not increasing rapidly when compared to the tremendous expansion of public-supported institutions in recent years. The challenge of size — to maintain a small-scale and working academic environment while still providing a broad spectrum of programs and resources — is a considerable one.

A dozen years ago the institution and the particular challenges it faced created the opportunity for initiating a major innovation — Project Reward.

The Beginning

With costs rising on every front in the mid-1950's, Rensselaer recognized the need for two courses of action: first, the need to find additional and larger sources of financial support, and second, the need to get more for the instructional dollar by conducting the business of educating more effectively. The former is well in hand through a major development effort, typical of what is being done on most campuses today. The second was brought into focus with the initiation of Project Reward.

rising cost of instruction in recent years . . .



A Rensselaer trustee first encouraged the Administration to examine the efficiency of the process of instruction. Quite naturally, the initial effort was to determine, by cost accounting procedures, the actual costs of instruction at Rensselaer. In the summer of 1956, the university's administration developed a method for collecting and analyzing instructional data and costs, testing the technique by analyzing costs for the previous academic year. Since that time, instructional data have been collected and analyzed each year, and these data supply the benchmark against which the cost and efficiency components of experimentation and change can be measured.

Once costs were known, the next step became the examination of the instructional process, with emphasis on turning up areas for fruitful experimentation. One possibility included the utilization of large groups and instructional technology (including films, slides, television, and demonstration material). In the summer of 1956, a survey of the uses of instructional technology on other campuses was conducted by Rensselaer staff members.

These studies set the stage for the formal establishment of Project Reward. Its initial funding and operational support for a two-year period were provided by the interested trustee. The Project was established with one basic objective in mind — to improve the quality and efficiency of instruction. From this overall objective came several others:

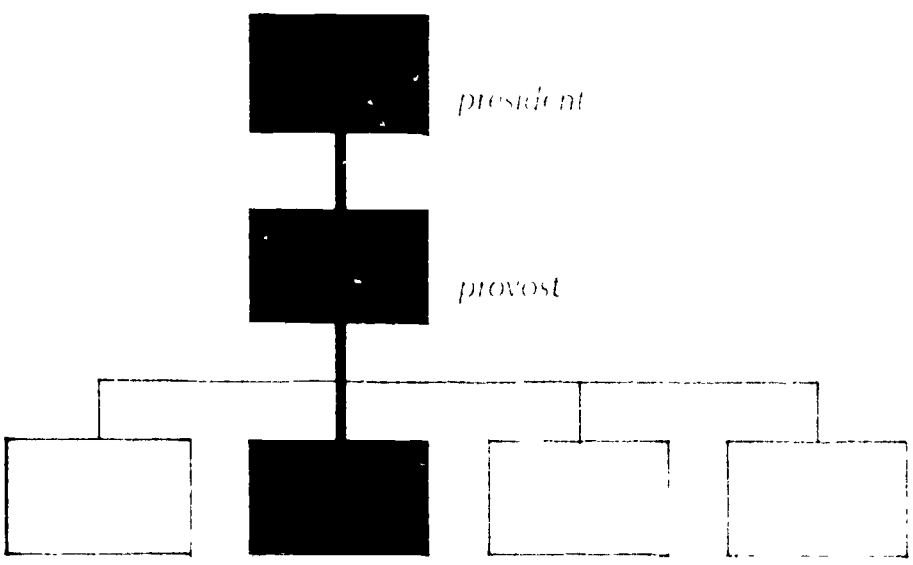
- ☐ to maintain accurate records of instructional data and costs,
- ☐ to aid the faculty in upgrading their instructional materials,
- ☐ to design and produce instructional aids and media,
- ☐ to conduct instructional research and demonstration projects,
- ☐ and to constantly evaluate the program in terms of the initial objective.

Why the name Project Reward for this undertaking? First, it was important to indicate that this was an experimental program or "Project." Secondly, the word "Reward" was adopted to convey the idea that such a project would bring both professional rewards to the faculty and benefits to the institution as a whole.

The Organization and its Housing

Project Reward began operation in February 1957. Because of the uniqueness of its objectives and the experimental characteristics of its program, the recruitment of staff was a particularly important effort. An educator, with a television, audio-visual, and professional education background, joined the Project in June, and eventually other specialists in the fields of motion picture and film production, photography, graphics, and data analysis were added.

a *direct line of communication*



From the outset, Project Reward was placed under the academic administrative wing of the Provost and was never affiliated with any academic department or school. Thus the Project staff was given the freedom to move between and within the departments and to encourage and counsel faculty without administrative restrictions. This freedom, and the lack of specific identification with any department is, in hindsight, one of its great strengths.

Consistent with its experimental nature, Project Reward was early housed in converted space — a former chapel, the downstairs of an old row house, and some rooms within an old orphanage — property which had been acquired at the edge of the Rensselaer campus. While far from ideal, and certainly not planned for these uses, these facilities have provided some interesting, experimental and flexible spaces for a program which has varied greatly through the years. In addition to its somewhat unconventional headquarters, Project Reward commandeered a bevy of smaller spaces around the campus for studios and technical support areas.

The Funding

Although the trustee's support of Project Reward provided initial operating funds, it was necessary to develop more and more self-sufficiency in financing programs. This was accomplished by direct governmental and private grants to Project Reward to support its instructional research and services, by sponsorship of activities by the various academic departments, by fee-for-service remuneration for the development of instructional materials, and by an annual appropriation in the Rensselaer budget.

Project Reward: Its Role at Rensselaer

Posed on the initial premise of improving both quality and efficiency of instruction, Project Reward's raison d'être began to evolve and mature in its early years. It included fulfilling six major roles on the Rensselaer campus.

FIRST, the staff of Project Reward offered educational consultation services to the Rensselaer faculty. The professor faced with a new challenge in the classroom was not an island unto himself, but could turn to Project Reward for advice and consultation to resolve his instructional problem.

SECOND, after consulting and planning with the professor, Project Reward followed through with technical, production, and support know-how to implement the desired instructional objectives. Thus it provided services to the teaching faculty through its resources and staff.

THIRD, the improvement of instruction requires case studies and projects of an experimental nature. Project Reward stimulated and encouraged classroom experimentation by working closely with the faculty in constructing experiments and by helping find the financial and administrative support for such experiments.

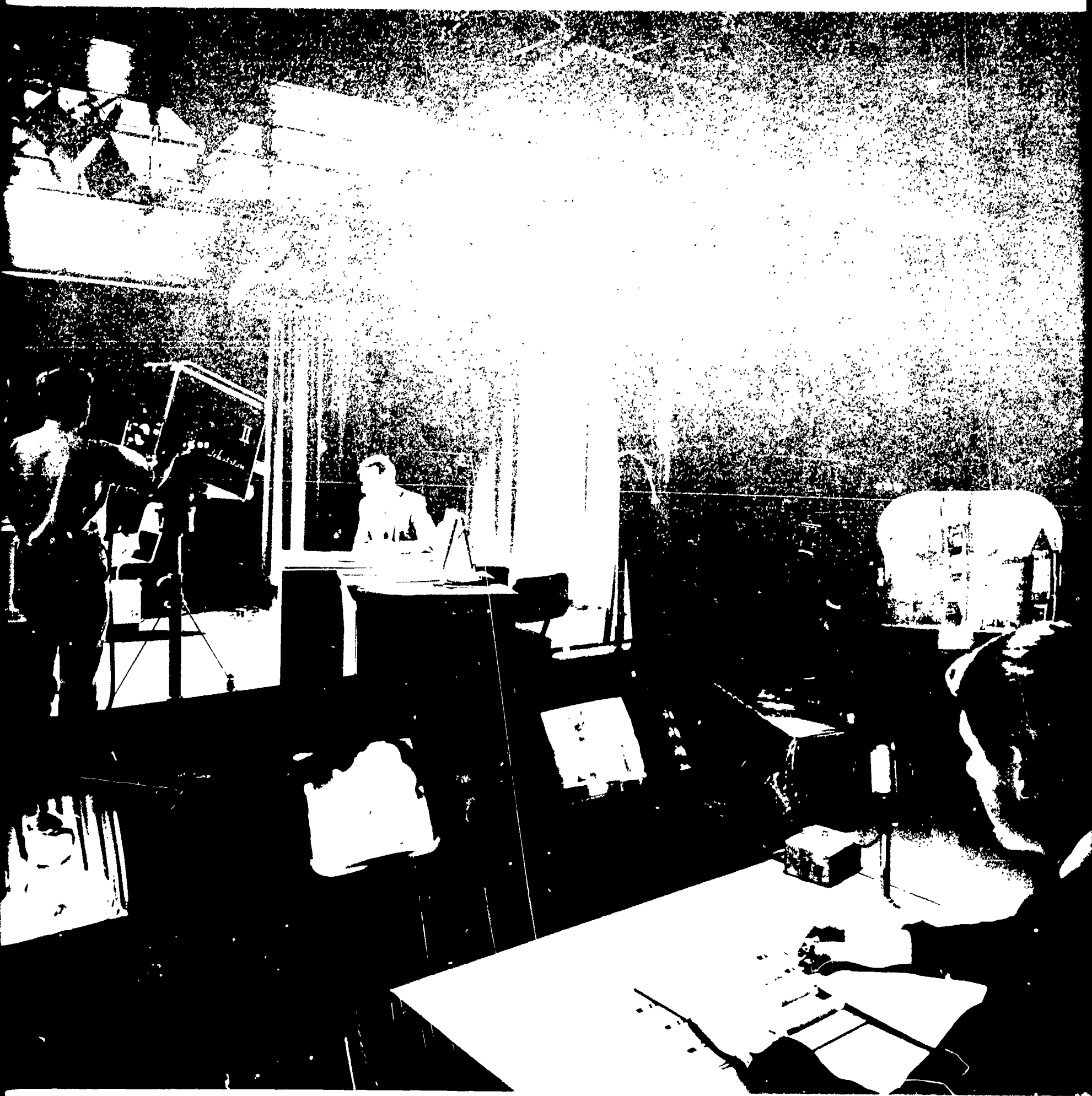
FOURTH, Project Reward's staff provided the experience and the methodology to assist the faculty in educational research, experimentation and evaluation efforts.

FIFTH, to encourage and stimulate other faculty members, Project Reward disseminated to the Rensselaer faculty and others information on educational experimentation both at Rensselaer and at other institutions across the country.

SIXTH, it follows that the effectiveness of the Project Reward effort would be measured, in part, by analyzing the cost of instruction on the Rensselaer campus; thus Reward could keep a constant check on itself.

Even though Project Reward no longer exists under that name, each of these six activities has become a very real part of RPI's day-to-day programs. An Office of Institutional Research, responsible directly to the Provost as was Reward itself, was established in 1961 to co-ordinate and direct these activities.

When the Project was conceived, the roles were experimental; now they are not.



the activities

At the heart of the Project Reward concept is the notion that improving instruction is not a unilateral act. Rather it involves a number of highly-integrated activities: CONSULTATION, PRODUCTION SERVICES, TECHNICAL ASSISTANCE, DISSEMINATION, and EVALUATION.

Let's look at these activities as they took place — and are still taking place — on the RPI campus.

/ consultation

The staff of Project Reward began by offering consulting services to the Rensselaer teaching faculty. Sometimes this guidance was as simple as planning a series of overhead transparencies to augment a single lecture; other times it became as sophisticated as the design of an entire experimental teaching-project utilizing multi-media systems.

Consider the case of a faculty member who was faced with new course material for presentation to a large lecture section rather than the more conventional recitation section. Further complicating the situation might have been inadequate facilities in which to conduct the class, a shortage of experienced technical assistants, and any number of other problems that might confront a college teacher. The professor could have gone to Project Reward for help in planning an appropriate solution to this instructional problem.

The Project staff would analyze the new material with the instructor, suggest new ways of bringing a variety of learning experiences to the student, and recommend instructional materials and equipment best suited to large group presentation. If the scope of the project warranted it, Project Reward might have helped the professor develop financial support. The Project staff would then complete the cycle by providing technical assistance and production support to help the professor as he taught the course, also assisting him in evaluating the experiment and disseminating the results on the Rensselaer campus and elsewhere.

Since the staff of Project Reward included people with many kinds of specialties and talents, a true learning systems approach to the solution of instructional problems could be employed. The teacher faced with a new challenge in the classroom was not an island unto himself, but was able to turn to Project Reward for the necessary advice and consultation to resolve his problems.

2 / *production services*

After laying the basic groundwork, the Project Reward concept said that the college must follow through with the know-how to implement the desired goals. This, in part, meant production services — services in motion pictures and still photography, live and taped television, illustrative arts, models, and demonstrations which might be used either in the classroom directly or brought to the classroom on film or via television.

Before Project Reward's production services came into being, the use of instructional aids was limited at Rensselaer. Overhead transparencies, slides, films, or television were not available for specialized subjects unless the instructor obtained them from outside sources or produced them himself.

The time and effort required to obtain materials, the appropriate equipment, and a suitable viewing or listening place was too demanding to encourage the regular use of instructional material in a course.

With the experience that instructional technology could provide more effective ways of presenting information and with the knowledge that the know-how to develop materials existed on campus, more and more of Rensselaer's faculty began to utilize the production services of Project Reward. Since 1958, when production services began on a limited basis,

- 22 major films and dozens of short, instructional films have been produced,
- over a half dozen departments have used either live or taped television for courses on campus,
- over 60,000 photographs and slides have been ordered by the faculty, and,
- more than 3,000 graphic materials have been prepared.

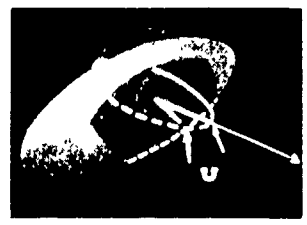
It can be seen that Project Reward's production services covered a wide range of instructional aids and media. The staff did not promote one medium to the exclusion of others, but tried to use whatever was most appropriate for achieving a given learning objective Sometimes this was a film, sometimes television, sometimes a set of slides, and sometimes a combination of two or more Thus the consultation that resulted in a plan for instruction often dictated a multi-media approach; when this happened, services, staff, and facilities had to react accordingly.

Motion Pictures

Project Reward developed the technical resources necessary for a wide range of film production activities. This included studio, animation, editing, and processing capability. The result took many forms: a full-length instructional movie, a short film or film loop, or simply a quick and inexpensive demonstration film.

The first instructional film produced by Project Reward in 1957 was "Techniques in Quantitative Analysis" for the Chemistry Department. It was estimated that this film cut in half the time originally required to present the same material by the lecture-demonstration method.

A series of films on physical methods of chemical analysis — "Infrared Spectroscopy", "Gas Chromatography", and others — was produced under a grant from the Perkin-Elmer Corporation. Since its completion, "Infrared Spectroscopy" has had nearly a thousand bookings, and, with several showings resulting from each booking, total attendance is estimated at 42,000 students and professional people.

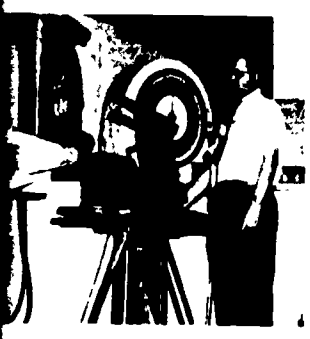


Of the films produced for the Department of Physics, "Satellite Orbits" posed the most challenging technical problems To present the concepts and relationships of orbital motion and celestial mechanics, animation was used extensively in the series. Sophisticated techniques, such as a multiplexing device to superimpose a computer-programmed oscilloscope trace over the image of a rotating globe, were used to achieve the exact orbital effect.

For freshman classes in Language and Literature, Project Reward produced a series of five instructional films to supplement a text written by members of that Department. The text attempted to classify language and communication by the uses to which it is put. The film series was largely concerned with non-verbal language events — paintings, sculpture, music, and dance — which had previously proven difficult to bring into the classroom for analysis and comparison with verbal language.

Five animation films were prepared for use in a controlled comparison of three methods of teaching introductory graphics. These films, each 15 to 20 minutes long with sound and in color, dealt with the theory involved in points and lines, planes, line and plane relationships, revolutions, and vectors. Each film was the result of a searching attempt, both in selection of content and filmatic design, to find the most effective way of presenting the analysis and synthesis of geometrical form.

Not all of Project Reward's films were major productions; some instructional requirements could be met by the unconventional "low-budget" film which is simply a visual record of events.



For example, a series of demonstrations developed for mechanical engineering was recorded in a black-and-white film without sound. These demonstrations, which usually take hours to prepare in the laboratory, could be shown quickly and easily in the classroom as a visual supplement to the lecture whenever needed.

The production of "low-budget" instructional films was made possible through technological advances in motion picture equipment, photographic materials, and the application of TV production techniques. Such films might be in black-and-white or color, sound or silent, and in lengths from a few minutes to an hour.

Photographic Services

In addition to motion picture photography, studio and location still photography, as well as film processing services, were made available to the Rensselaer faculty.

Because they are "pieces" which can be assembled in many ways, color slides have been proving more and more useful in teaching. Since this trend was perceived by Project Reward, 60,000 slides have been produced at Rensselaer. A related slide effort was converting the Institute's large, but bulky, collection of 3¼" x 4" glass slides to the more convenient 2" x 2" size. Slide production is still a major activity at RPI, with requests ranging from a few slides to fill in gaps in presentations to carefully designed slide "packages" or instructional units.

In addition to slide-making, Project Reward instituted a photography program designed to provide visual materials for use in films, television production, publications, and exhibits. These services covered (and still cover) film processing, photograph printing and enlarging, and mounting of visual materials. The only major exception to the philosophy of doing the work "in house" has been the processing of motion picture films; this has always been done commercially.

Another important facet of photographic production at a technological university is the development and use of microphotographs. These are particularly useful in chemistry and embryology courses since they enable the lecturer to present instantaneous color views which would otherwise require laboratory conditions for observation by a large group.

These production activities require a staff with high technical and artistic skills, extensive production equipment, and space. The chapel space used by Project Reward, while lacking in many of the amenities, has always afforded a high degree of flexibility. Lighting, acoustics, utilities, and support facilities do leave a good deal to be desired, however; the Rensselaer communications center proposal includes better accommodations for these important spaces.*

* The problem of improved production facilities for Project Reward was considered in the design of a new communications center for Rensselaer — see page 32.

Television Production

At Rensselaer most entering students are required to take introductory chemistry for two semesters. Some 1,000 students are involved, of which only about six percent intend to major in chemistry. Four years ago it was decided to experiment with closed circuit television for presenting the lecture parts of this course.

To accommodate a lecture group of 500, old and conventional West Hall Auditorium was equipped with 15 overhead TV receivers. On the stage, three TV cameras focused on the presentation area: a manually-operated viewfinder camera followed the overall action of the lecturer, a remote-controlled camera showed close-up details of the experiments or surveyed instruments and recording devices, and a static overhead camera magnified graphic materials and the lecturer's explanatory notes. From the control console, located out of student view, a television producer selected the appropriate picture to be viewed by the class as the lecturer shifted the action from one area to another.

The development and co-ordination of this experiment was typical of the television efforts initiated by Project Reward. From counseling with the faculty to providing the hardware, conducting rehearsals, and running the show, the staff worked side-by-side with the Chemistry faculty. This course continues to be conducted this way and in the West Hall space.

Since 1963 the Department of Psychology has used closed circuit television in connection with the teaching of several sections of General Psychology. Students meet in one or two large classrooms (100-150 students), and televised demonstrations are presented live or via videotape. Here television has proven its worth in the handling of demonstrations where human and animal subjects must be placed in a controlled or isolated environment for proper experimentation and observation. Other instructional advantages of the television system include the ability to present close-up views of subject responses.

In courses in embryology and comparative anatomy, the Department of Biology uses closed circuit television to project images from the microscope

In some freshman and sophomore physics courses, the lecturer discusses laboratory experiments televised from instructional laboratories across the campus. TV cameras in the research laboratories also enable large groups to become more familiar with some of the research activities at Rensselaer.

ctivities such as these require a "system" of television facilities cross the campus. Currently Rensselaer utilizes a cable network, nking a variety of origination points to a variety of viewing oints, in order to accommodate,

- closed circuit television within a large classroom for magnification and emphasis.
- closed circuit television from the studio to one or more classrooms or from laboratories or a lecture hall to one or more classrooms.
- television recorded in a studio, laboratory, or classroom and "played back" in classrooms or laboratories.

ustrative Arts

hen Project Reward set up shop, it became evident that graphics oduction services would be an important part of its program. ot only would charts, posters, and drawings be necessary for e in the classroom, but these would also be necessary to proce other instructional materials — motion pictures, slides, erhead transparencies, and television graphics. This included awings and art work for Reward's animated films and many of e materials for the television courses offered on campus.

he enthusiastic response of the faculty to the overhead projector, hich replaced the chalkboard in many situations, generated the ed for hundreds of overhead transparencies. Some transparenes required photographic enlargement, but most were produced the artist using thermal or diazo type processes.

A section of Project Reward's chapel was devoted to produc of illustrative arts; here faculty came for consultation with graphic artist, and from here flowed a wide variety of mate for all kinds of instructional uses. Like many other Project Rev activities, graphics production services are still provided thro the Institute's Office of Institutional Research.

Model and Demonstration Development

Lectures in several basic science and engineering course Rensselaer have always relied on models and demonstrati Not only is this apparatus bulky, causing storage problems, it is often difficult or expensive to set up and use. Historic too, the problems of 200 students straining to see the demon tion created the need for the steep-sloping, high-ceilinged inst tional amphitheater.

Under Project Reward's guidance small demonstrations v magnified and projected for all to see through the use of o head and shadow projection. Closed circuit television allo further magnification in addition to the possibility of rem origination. Videotape and film clips made some demonstrat even more effective through t e possibilities inherent in edi time-lapse, and replay.

Whatever the problem, the Project Reward staff assisted the structor in choosing the best medium for bringing his models demonstrations to the student. Once the materials were ass bled or the demonstration set up, it followed through assistance in production and distribution.

3 / *technical assistance*

As part of its integrated services concept, Project Reward provided technical services for the operation and maintenance of closed circuit television, multi-media classroom facilities, and related audio-visual equipment and systems at Rensselaer. Like the consultation and production services, these have been fully integrated into the day-to-day programs of the Institute.

Since the inception of Project Reward, operator services have been available on an automatic daily basis to all faculty members conducting regular instructional programs in about a dozen multi-media classrooms and lecture halls on campus. These services have also been extended, on request, to faculty teaching in classrooms not on the regular schedule. Operator services include the setup, adjustment, and operation of projection, television, and audio equipment within each facility and between them and the TV studio. When desired, several classroom facilities can be interconnected for simultaneous audio and visual presentation.

Project Reward developed, and now the Office of Institutional Research provides, assistance in the operation and maintenance of departmental audio-visual equipment. Included is instruction in the operation and care of film and slide projectors, tape recorders, overhead projectors, and other types of audio-visual equipment, as well as consultation on the care and storage of instructional materials such as slides, transparencies, and films.

The technical staff is composed of full-time technicians and part-time student assistants and is currently housed in a number of work and maintenance areas around the campus. This dispersal is necessary to place the technical assistance where its demands are heaviest: near the studio and multi-media classroom facilities.

4 / *dissemination*

As a means of keeping the Rensselaer faculty and other interested educators informed of the continuing results of Project Reward and other educational research projects within the Institute, the Project Reward staff established a newsletter, "Toward More Effective Teaching at Rensselaer". In addition, information was disseminated through reports, professional journals, conferences, and seminars. Reports of educational research at other institutions were also collected and circulated among the Rensselaer faculty. By making known the methods and results of those using new teaching techniques and equipment, Project Reward was able to stimulate and encourage faculty members to take advantage of its services.

Furthermore, the instructional materials produced by Project Reward — films, slides, overhead transparencies, demonstrations — have always been made available to other institutions. This type of dissemination from classroom setting to classroom setting, and from teacher to teacher, may prove to be one of the most significant contributions of Project Reward.

Today, these activities are carried on by the Office of Institutional Research, Project Reward's successor.

5 / *evaluation*

Without some means of evaluation, there would be little clue as to whether an effort like Project Reward was meeting its stated goals and objectives. As it was designed to assist various members of the faculty in evaluating their experiments, so it had to evaluate its own activities and programs.

The success or failure of Rensselaer's Project Reward can be measured, in part, by analyzing the cost of instruction at the Institute. Each semester, since the 1955-56 school year (the benchmark year), faculty members have been asked to submit a Faculty Activities Report. From these reports, which are translated into 30 or more tables and graphs, administrators are able to analyze the unit cost of instruction in three forms: by student credit hour, by student contact hour, and by instructor contact hour. The "cost of instruction" analysis presented on page 18 is one measure of Project Reward's success at RPI. Other annual analyses include facilities utilization (which is helpful in developing long range campus planning objectives, programming new buildings, and planning facilities renovation), faculty productivity, growth ratios, and rates of change in critical areas from year to year.

The faculty and administration are interested also in evaluating the students' attitudes toward new teaching methods and measuring the level of achievement.

As part of a Strength of Materials Laboratory teaching experiment, the achievements of 234 engineering students instructed over closed circuit television by senior faculty members were compared with the achievements of 199 equally able engineering students instructed during the same term in the conventional manner by part-time laboratory instructors. The grades showed no significant differences in the attainment of the two groups, and an analysis of various categories of quiz questions and questionnaire results confirmed that the television method of instruction was just as effective in achieving the educational objectives of the course as the conventional laboratory procedure. Student opinions in both groups were surveyed by means of an 18-item questionnaire with a seven-order preference scale for each item. A blank sheet was also provided for voluntary comments and appraisals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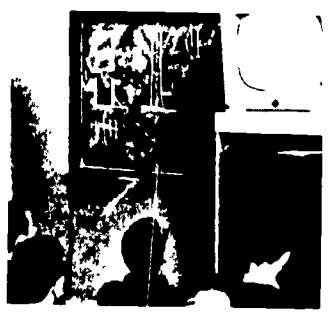


Graphics was taught to three selected groups of freshmen, varying the method of instruction with each group. Student achievement and . 'on to the different methods of presentation was surveyed by the same methods and yielded similar results as the survey in the materials laboratory course.

It is impossible to evaluate an instructional program without considering the facilities component. Several elementary attempts were made to design appropriate media-oriented facilities in the early years of the Project. With the completion of the research report, "New Spaces for Learning," in 1961 by the Center for Architectural Research, it was decided that a full-scale mock-up incorporating the principles set forth in "New Spaces" would have to be built to thoroughly evaluate this concept for large group multi-media facilities. The mock-up was used daily for scheduled classes and provided in-use study, evaluation, and refinement of this new facility type. During this period faculty, students, and visitors participated in an evaluation of the classroom, and the results were used by Project Reward in developing other instructional facilities on the Rensselaer campus.

Although a precise measurement of the total impact of efforts like Project Reward is impossible, cost analysis, test data, and opinion gathering are all useful and essential guidelines by which faculty and administrators may judge results and make future decisions.

the facilities

Through the years of its operation, Project Reward exerted a number of important influences, both on the Rensselaer campus and in the world outside Troy. As reflected in the numerous projects and evaluations undertaken by Project Reward and by other members of the faculty, it is evident that it has had significant influence,

- ☐ on the teaching faculty and their methods
- ☐ on the students and their attitudes
- ☐ on the utilization of educational technology
- ☐ on curricula and course content
- ☐ on academic administration and policy
- ☐ on facility and campus development

When measured against pre-project projections, instructional costs at Rensselaer are not as high as they would have been without this program; a growing core of faculty has been involved with instructional experimentation, and the use of instructional technology has completely revised approaches to teaching many courses on campus. Slowly but steadily, faculty have availed themselves of Project Reward's consultation; dissemination activities have begun to create influences beyond the boundaries of the campus; and finally Rensselaer now knows how much it costs to educate its students and where the dollars go.

The topic under discussion is facilities; and to assess the influence of Project Reward on physical plant, it is necessary to look behind the facts and figures into some specific changes wrought by the effort.

Rethinking Class Size

In any effort to improve instructional effectiveness, one of the inevitable sacred cows to come under scrutiny is the 20- or 30-man class. While the "recitation" works for many courses, its inefficiencies -- particularly where expensive demonstrations and complicated experiments are involved -- have long been noted. To this end, Project Reward became involved in a series of experiments with class size — all with potential facility influences.

In the late 1950's, with funds granted by the Fund for the Advancement of Education, the Department of Mechanics initiated a research program on class size; the objective was to determine whether large classes in multiple section courses could be taught effectively without sacrificing quality. Students were grouped in three different ways — in sections as small as 20 students or less, in lecture sessions of about 100 combined with small discussion groups of 20 or less each meeting every other day, and as lecture and discussion sessions in a large group. Each approach was analyzed in terms of the number of weekly contact hours required by the staff and by the overall grades and examination scores of students in each of the groups. The conclusion was reached that large group instruction held real promise. Similar experiments were conducted in mathematics, physics, chemical engineering, metallurgical engineering, psychology, and language and literature.

The verdict in each of these efforts was similar, and the large group became accepted as one way to handle some parts of the teaching load more efficiently. With the increasing popularity of large group methods, however, the inadequacies of the university's physical plant became quickly apparent: more and better large group spaces, seating from fifty to several hundred students, were badly needed.

Introducing Instructional Technology: The Strength of Materials Experiments

The introduction of instructional technology into the curriculum also began to create pressures on existing plant. Another experience in the Mechanics Department illustrates the problem.

For many years the laboratory part of the basic course in Strength of Materials had been conducted with groups of students standing around large testing machines and observing tests being performed on material samples. This approach had some serious limitations; only a small group of students could be accommodated around a testing machine at any one time, and the required number of instructors could be met only by using graduate students as teachers. With increasing enrollments in the Strength of Materials course, it was becoming apparent that an additional laboratory would have to be constructed.

Interest in television and experimentation with large group instruction seemed to click, and it was decided to experiment with the Strength of Materials Laboratory by teaching it over closed circuit television. In this way the two previous limitations could be overcome: a large group of students could see the experiment simultaneously via the eye of the camera, and the very best professional teacher could teach the course.

So it was that students were taken out of the laboratory, and TV cameras took their place. Large groups of students, meeting in admittedly make-shift space, received their instruction from the testing laboratory. In the laboratory, testing machines were painted for the best contrast over television, and special lighting and intercom devices were installed, linking the laboratory with the lecture room. At one end of the coaxial cable were testing machines, TV cameras, and the professor; and grouped at the other end of the cable were television monitors, students, the classroom instructor, and a number of supplementary aids and media.

While the laboratory-by-television experiment was in progress, the decision was made to remodel an existing large group space in the Civil Engineering building. This, the first large group room created for the needs of Project Reward, was designed to accommodate 150 students.

While the room is unsophisticated in terms of what we know about large group spaces today, the thinking behind this room — Troy 101 — remains substantially unchanged. It is not simply a room with students and monitors, but rather a room which provides for a multi-media display of information. A large rear-projection screen, remote control of lighting, and special lighting were, therefore, essential parts of the Troy 101 design.

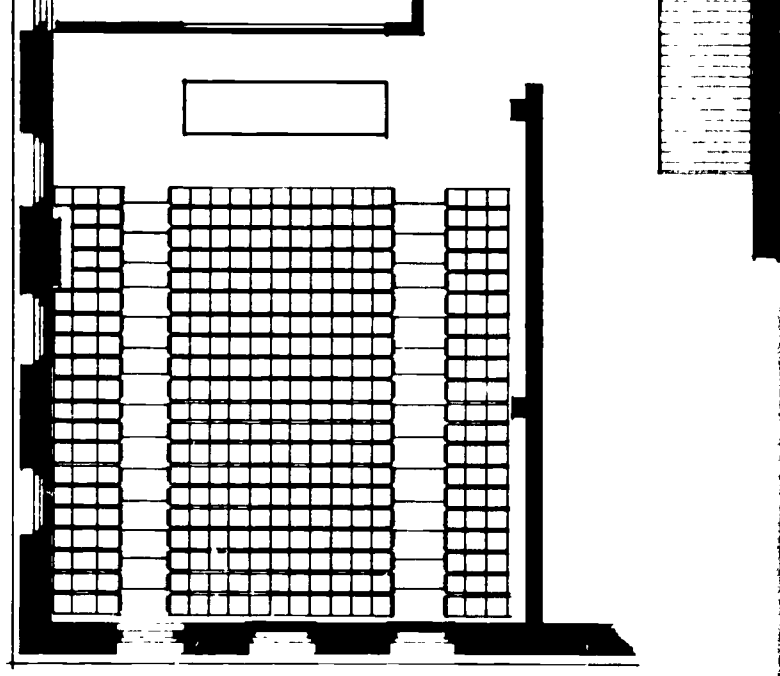
Once Troy 101 was remodelled for the Strength of Materials Laboratory, it also became available for other courses that could be taught in a similar fashion. It soon became a popular room for all forms of large group instruction, as well as for meetings, conferences, and other non-course uses. The cynics said the room was popular because it was one of the few air-conditioned rooms on the campus, but it became obvious that there were more significant factors in the room's success: it allowed the presentation of information and instruction in many different forms and the use of many different media.

The next refinement in the Strength of Materials project was the realization that scale models could be used as appropriately as the large scale testing devices to demonstrate basic principles and properties of materials. A small television studio was created for this purpose, and work was begun on developing scale models to carry the message, rather than utilizing the large and cumbersome testing machine in the laboratory.

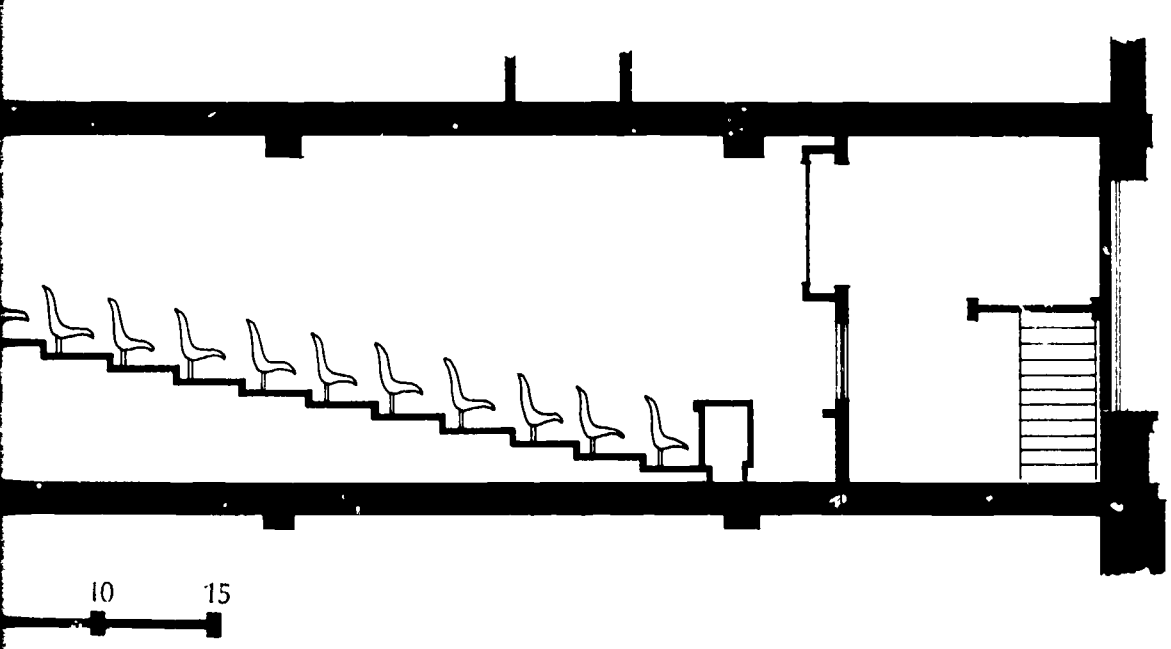
Curricular changes, however, made Strength of Materials Laboratory an elective course rather than a required one, and enrollments began to drop. Detailed monitoring of the experiment had revealed that the "break-even" point for economically produc-

ing the course via television was about 200 students (above 200, the televised approach would do the job at less cost than the previous method)*. Hence, when the course enrollment dropped below 200, the televised methods and further development were abandoned. The experiment, however, had great significance for Rensselaer:

- ☐ it introduced television to the campus,
- ☐ it proved that large group instruction could be effectively employed in a situation where traditionally a laboratory approach had been used, and,
- ☐ it developed a studio and a large group room which were now available for other experimental purposes.



* The results of this and other studies made by the Project staff, or in conjunction with Project Reward, are documented in several reports on file at Rensselaer.



Room 101, Troy Building, was the first room renovated for media use on the Rensselaer campus. Located in a large space in the Civil Engineering building, it was designed to provide for television in addition to a variety of projected media. With the exception of the overhead projector, all media are rear projected.

Technically the room possesses a number of flaws; after all, very little was known about media-oriented large group facilities when it was designed and built. The shape of the space could not be helped, and consequently some of the 160 seats have less than excellent viewing conditions. The rear projection set-up has worked well, but the fixed laboratory/demonstration table and the closeness of the first row of seating has made overhead projection somewhat inconvenient. Chalkboards occupy much of the "prime" display surface area.

All media controls are provided in the demonstration table; significant improvements in the 'human engineering" of the controls will be seen in the Experimental Classroom, however. Lighting controls are on the master panel but are not tied to the media. A fluorescent lighting system (integrated with air conditioning ducts) is used. A secondary system of red lights for use during certain media projection, while copied extensively by other colleges, has proven to be unnecessary.

Movable tablet-arm theater seating is placed in parallel rows facing the front of the room. While very comfortable, evaluation of later seating installations at RPI has found other approaches more desirable.

Troy 101 has received continuous utilization from the semester it was first opened as a renovated media-oriented room. It has accommodated courses as diverse as psychology, nuclear physics, graphics, biology, and the Strength of Materials Laboratory for which it was originally conceived. More importantly, it has served to provide a good deal of useful experience — experience used as "input" in designing newer media-oriented instructional spaces at RPI.

Room 101, Troy Building
Rensselaer Polytechnic Institute
Renovated in 1960

The First Facilities Project: DASFEE

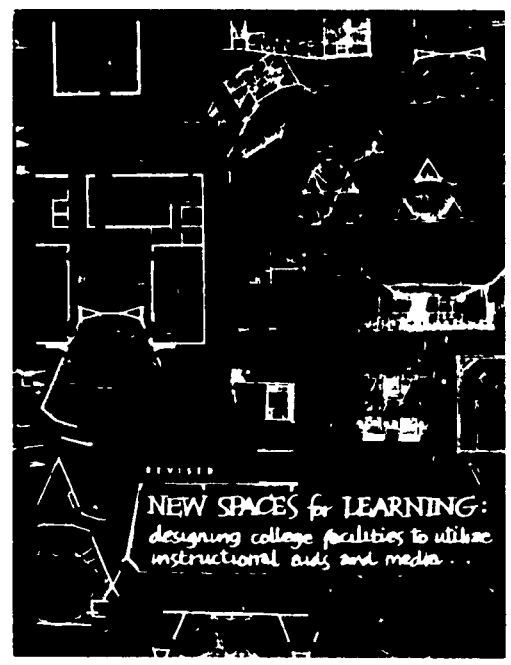
Concurrent with the Strength of Materials experiments and the remodelling of Troy 101, the Chemistry and Physics Departments were becoming increasingly concerned over the problems of presenting demonstrations and experiments in their lecture sections.

Through the assistance of Project Reward, the faculty in these courses began to incorporate other forms of communication into their lectures: overhead projection for transparencies and models, shadow projection, slides, film clips, and closed circuit television for magnification. All of this was taking place in conventional lecture halls which were proving more and more inadequate as the presentation techniques became more and more sophisticated.

Late in the 1950's, it was becoming obvious that a large lecture hall facility was necessary to handle the lecture aspect of basic courses such as chemistry, physics, and mathematics. It was also obvious that this lecture hall had to be something special since the lectures were so heavily committed to demonstrations and audio-video media. Since Rensselaer was then conducting preliminary planning studies for a science complex, a large lecture room, replete with turn-table stages and many projection surfaces, was proposed.

As planning progressed, however, it was apparent that more information was necessary to appropriately program and plan the facility. In response to the need, some research faculty members in the School of Architecture pursued and received a grant from Educational Facilities Laboratories to support such a study. Identified as Project DASFEE (Design of Auditorium-Studio Facilities for Engineering Education), the project developed design and planning criteria for large group instructional facilities utilizing aids and media. The information developed was presented in a report which was distributed as "New Spaces for Learning" and came at a time when many other colleges and universities were seeking similar answers to similar problems.*

"New Spaces" addresses itself to the criteria that owners and architects should keep in mind in planning large-group spaces for instructional aids and media. The technical notions of image viewing, lighting, seating, acoustics, and projection systems are discussed in architect's terms, and several prototypical spaces are shown. In many ways, "New Spaces" can be considered the first widely-disseminated report on designing large group teaching spaces for the new communications technology.



* "New Spaces for Learning", originally published in 1961, has since been revised. This later version, issued in 1966, not only updates many planning criteria in the light of subsequent experience, but it also includes a complete description and critical evaluation of a case study large group facility — Rensselaer's Experimental Classroom.

s for Rensselaer specifically, the report showed that the large nstructional auditorium with elaborate turn-table stages was an xpensive facility and one difficult to justify from the utilization tandpoint. It suggested that perhaps a number of smaller, large roup lecture halls interconnected by closed-circuit television ould be a better answer. To date, a large instructional audiorium has not been built on the Rensselaer campus, but a long-erm program provides for large group spaces by not only inluding them in new building plans, but also by renovating xisting rooms around the campus.

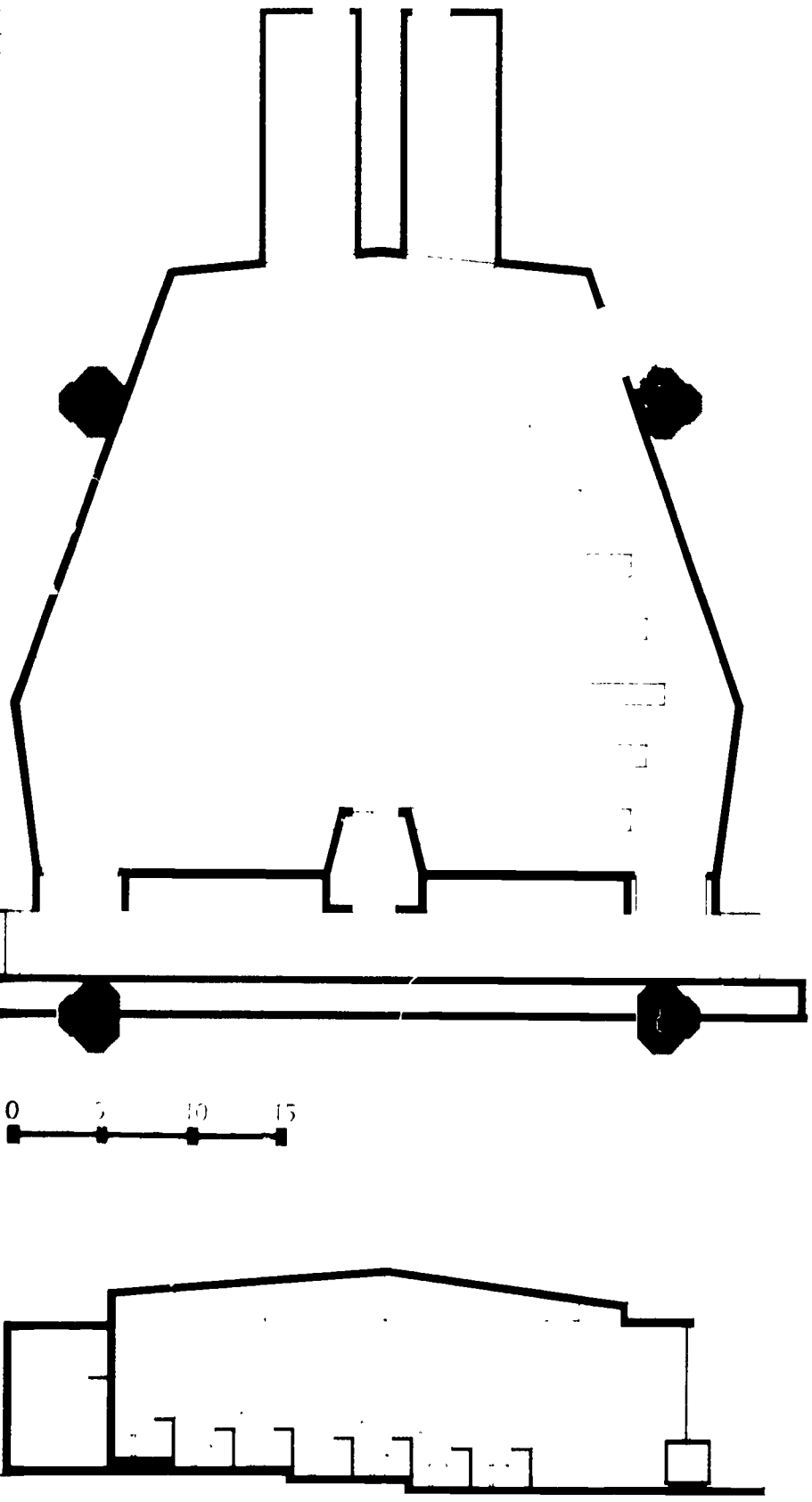
An Experimental Classroom

The conduct of the DASFEE project was complicated by the fact hat there were no exemplary large group media facilities avail-ble to visit and study. When the project was completed i ,961, he kind of room proposed by "New Spaces" had yet to be built. n order to evaluate the design criteria presented, the only answer was to build a mock-up and try it out.

About this time a convent adjacent to the main Rensselaer campus was purchased, and the chapel, no longer to be used for religious functions, appeared to be just the right sort of space within which to build a full scale mock-up of a large group instructional room. Based on one of the design studies proposed in "New Spaces for Learning", the architectural research group prepared a proposal which would utilize the transept of the chapel for the construction of a 100-seat classroom which, although of mock-up construction, would follow all the dictates of "New Spaces for Learning" in terms of seating, shape, lighting, acoustics, color, media systems and controls, display surfaces, circulation, and adjunct facilities. The proposal was approved through the joint support of Rensselaer's Educational Resea Council, the Development Office, and Project Reward; like T 101 before it, some financial support was made available by interested Rensselaer trustees. Planning and detailed design w completed early in the spring of 1961, equipment manufactu and suppliers were solicited later that spring, the shell was b in the summer, and the room was fully equipped and ready operation by October of that year.

Basically the Experimental Classroom is a 100-seat lecture r utilizing a variety of display surfaces, television, carefully-desig lighting, remote projection controls, and stepped, counte seating. The instructor has the choice of presenting mat through his lecture, projected slides (two screens), televis films, overhead projector, live demonstrations, or various c binations of these approaches. To accomplish this, he us simply-designed lectern with remote control for all equipm At his right hand is a cart with a mounted TV camera for playing prints and models over the TV receivers in the r When he chooses to use one of the display surfaces, the ligh is automatically adjusted. Finally, a technician (often a stud is always on call when the room is in use.

After its completion, the Experimental Classroom was used tinuously for courses as diverse as graphics, biology, econo physics, and architectural theory. In addition to its role in university's day-by-day instructional program, it served as an educational and an architectural laboratory. It provid proving ground for new instructional approaches in a wide va of disciplines; and the Classroom's architectural features - design, its lighting, its seating, its acoustics, and its proje systems — were under constant evaluation by the architec research group which designed it. This "architectural labora aspect of the Classroom has allowed RPI to learn by exper in the design of subsequent large group spaces.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In 1961, the staff of Project Reward and RPI's architectural research group planned and built an Experimental Classroom on the Rensselaer campus. Placed in the transept of a deconsecrated chapel, the room was of mock-up construction, construction which would allow changes in the room's physical aspects if experience proved them necessary.

The room's tenure was short, but its contribution was significant. Its temporary nature and an expanding next-door neighbor collaborated to close its doors in 1968. Conceived as both an educational and architectural "laboratory," the room's physical aspects were constantly evaluated, and the results disseminated far and wide.

Basically the Experimental Classroom was designed to provide an environment in which a full complement of media possibilities could be used. The type and location of display surfaces and the relationship of these display surfaces to the room's viewers were considered to be most important. As can be seen, a number of display surfaces were provided, the room was shaped for optimum viewing, and none of the room's 100 students was more than 35 feet from any display surface. A section taken through the Classroom proved that adequate sight lines could be provided without steep floor slopes and excessive room volume.

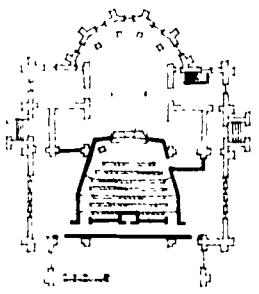
The media were all controlled from an instructor lectern, and this feature of the room was probably its most successful. Tying lighting levels to the media not only provided just the right amount of light in the room whenever an image was projected, it also relieved the instructor of worrying about it. The simple array of switches on the lectern also avoided the "instrument panel" approach to large group teaching!

A direct downlighting system was provided. This caused a variety of problems in terms of heat, multiple shadows, and "scalloped" lighting effects on some of the display surfaces. Experience with these problems was brought to bear on the lighting in rooms 138 and 139 of the Sage Building at RPI (see page 31).

Acoustically the room was most successful. The seating type, too, represented an improvement from Troy 101.

Through its seven years of use, the Experimental Classroom accommodated a wide variety of courses and activities. Nearly every department on campus used the room at one time or another, a typical day often provided utilization as diverse as an architectural history group, an economics class, a demonstration by the Project Reward staff, a student thesis presentation, courses in graphics and biology, and an in-service workshop in library automation.

Perhaps more than any other room developed in the context of Project Reward, the Experimental Classroom has influenced the design of large group facilities for media everywhere.



The Experimental Classroom
Rensselaer Polytechnic Institute
Created in 1961, dismantled in 1968

The Experimental Classroom was, by design, a temporary structure, and in 1967 its use was discontinued to make way for library expansion. In terms of meeting objectives, however, it has accomplished three things:

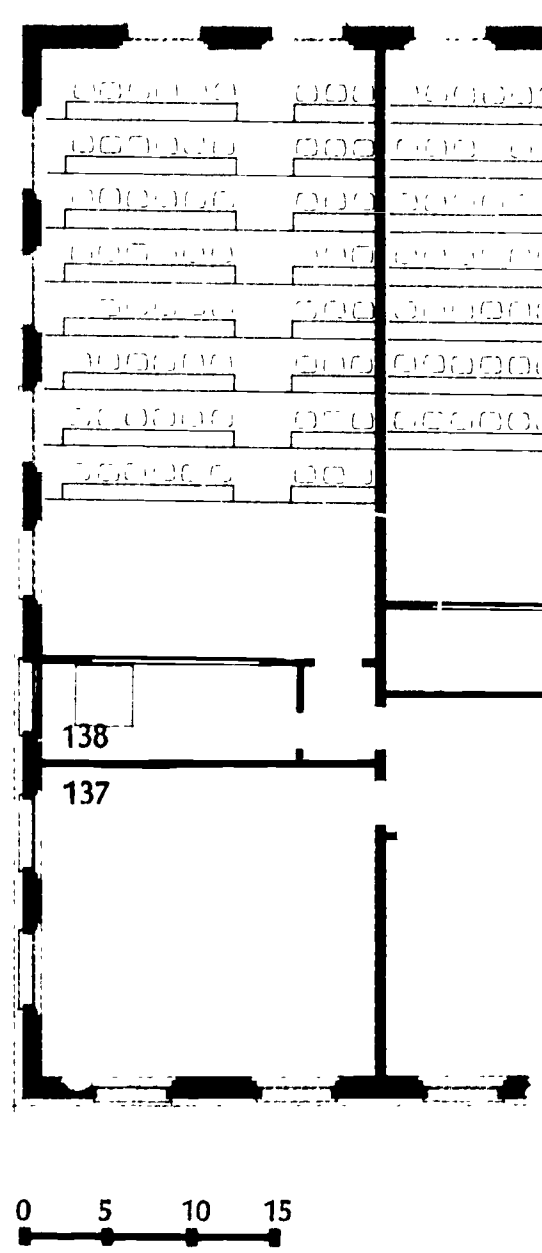
- ☐ It provided the setting in which educational research activities could be conducted at Rensselaer, specifically in large group instruction and in the utilization of learning media.
- ☐ It provided the training ground for teachers and the Project Reward staff to work together cooperatively in the reorganization of learning and in the development of new material.
- ☐ It provided the opportunity for evaluating basic design principles employed in the design of such instructional facilities.

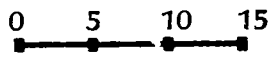
The growing impact of Project Reward, coupled with faculty and student acceptance of rooms such as Troy 101 and the Experimental Classroom, has created a desire for more such facilities at Rensselaer. Response has come in two separate-but-related efforts: a systematic renovation program and the development of a "communications center" concept which places several large group rooms and their media support facilities under one roof.

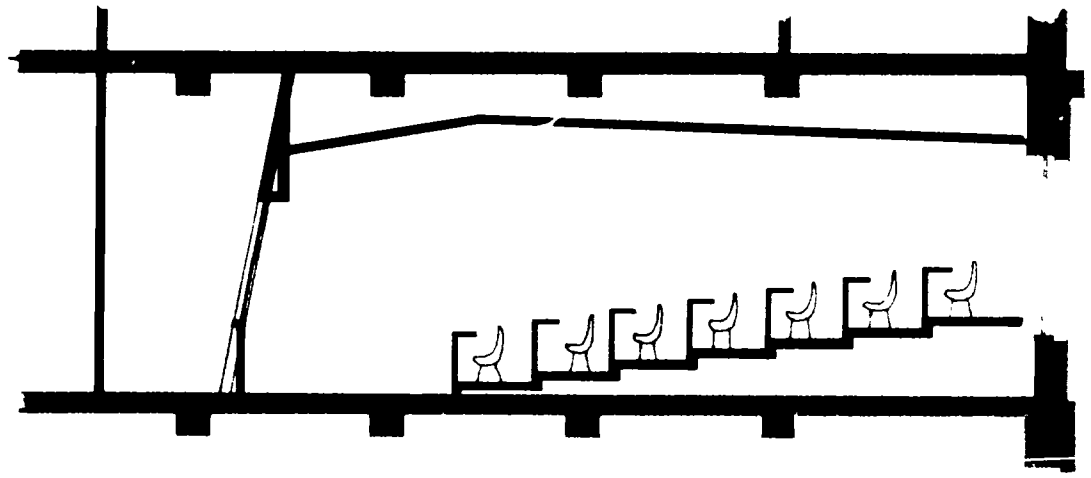
The Renovation Effort . . . and More Work for Project Reward

Because Rensselaer already possessed a good deal of instructional plant (albeit much of it outdated), it became apparent that systematic renovation of space would play a major role in introducing appropriate media-oriented facilities on campus.

Since the building of the Experimental Classroom, almost a dozen additional large group facilities have been created from existing space on the campus. These range in capacity from 70 students to 350, and provide varying degrees of media utilization. Each room is an improvement over its predecessor; lighting, seating, and projection systems particularly have become more and more refined. The latest efforts, shown here, are proud successors to a long program of facilities research and experimentation beginning with Troy 101 and extending through DASFEE, the Experimental Classroom, and subsequent renovations.







In 1966, before renovation was undertaken, these rooms looked very much like the adjoining room 137 shown in the photo: old, chalkboard-oriented, with permanent bench seating on risers. Built on the experience gained from five years of observation and use of Troy 101 and the Experimental Classroom, rooms 138 and 139 provide effective environments for large group, media-oriented instruction. They seat 72 and 63 respectively.

Renovating the rooms was a joint undertaking between the staff of the Office of Institutional Research and RPI's Center for Architectural Research. Once again, the stepped floors and canted ceilings are introduced for good sight lines and acoustics; the total volumes of the rooms, however, are not excessive (an important factor in renovation).

A fluorescent lighting system, with multiple circuiting to achieve an intermediate level for media viewing was selected. Special louvers are used to keep light from spilling on the display areas.

The seating represents another lesson learned from the Experimental Classroom: counter tops are grey (the white ones provided too much glare) and the seats themselves are not fixed but loose (some of RPI's students didn't fit so well in the Experimental Classroom's seats!).

The narrowness of these rooms dictated a careful examination of display surfaces: there simply wasn't much room available.

Growing acceptance of the overhead projector, along with a growing awareness of the chalkboard's limitations in the large group, suggested that the latter might be replaced. And it was, with a so-called "50-50" screen that allows both front and rear projection.

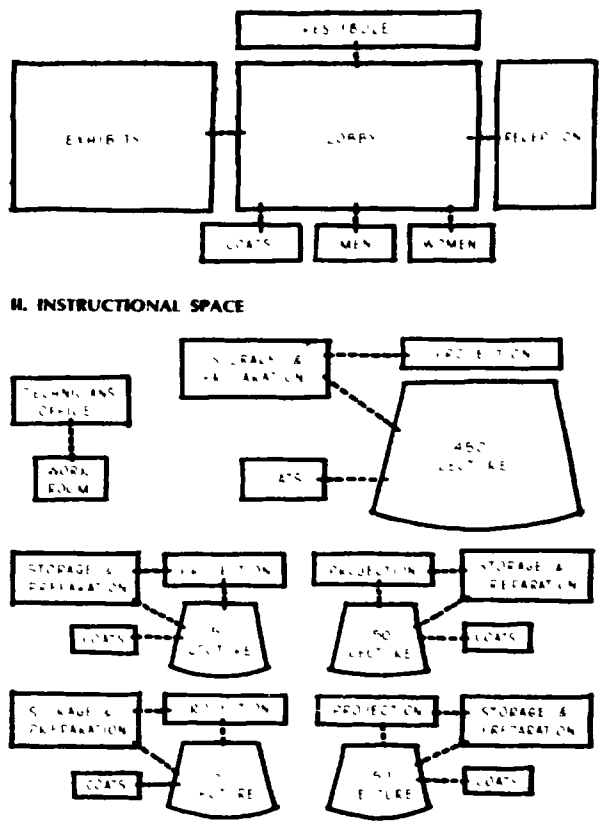
Many instructors use the twin overhead projectors, but still others take advantage of the film and slide media capability provided from the rear projection area. As in the Experimental Classroom, all controls are centralized on a simple lectern, and room lighting levels are tied to the media.

The renovation and installation of equipment in these rooms is still too recent for detailed evaluation. They do, however, represent another milestone in the development which began with Project Reward and Troy 101.

Rooms 138 and 139, Sage Building
Rensselaer Polytechnic Institute
Renovated in 1967

The activities of Project Reward inspired the renovation program, but the Project's involvement did not stop there. Once the facilities were built, it was the Project's responsibility to operate them from an instructional standpoint — to provide the technical staff and the support and production services for the teaching faculty. Standing alone facilities cannot achieve, for the faculty and students that occupy them, the desired objectives; it is the Project Reward kind of effort that completes the instructional system by providing the instructional materials, support, and evaluation.

It is this "chicken and egg" philosophy that was responsible for so much of Project Reward's success: its programs created the original demand for adequate facilities, the facilities were built, the Project operated them and provided the follow-through which made the rooms educationally viable, more and more faculty used them, creating a further demand for adequate facilities. Through this cycle, the big result has been the improvement of instruction and instructional facilities; with careful planning and monitoring, instructional costs have been kept under control.



a schematic building program for Rensselaer's Communications Center

The Communications Center Concept

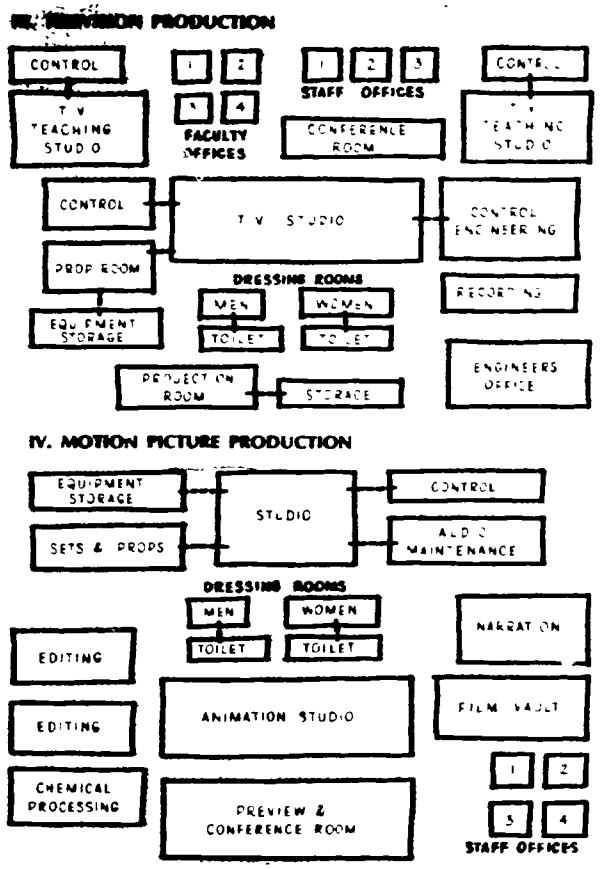
While systematic renovation can fulfill initial needs for large group spaces, it is always apparent that there is a limit to economical remodelling. The desirability of specially-designed group facilities, coupled with the increasing media and media-support acivities suggests a new building type for the college campus: the so-called communications and lecture hall center.

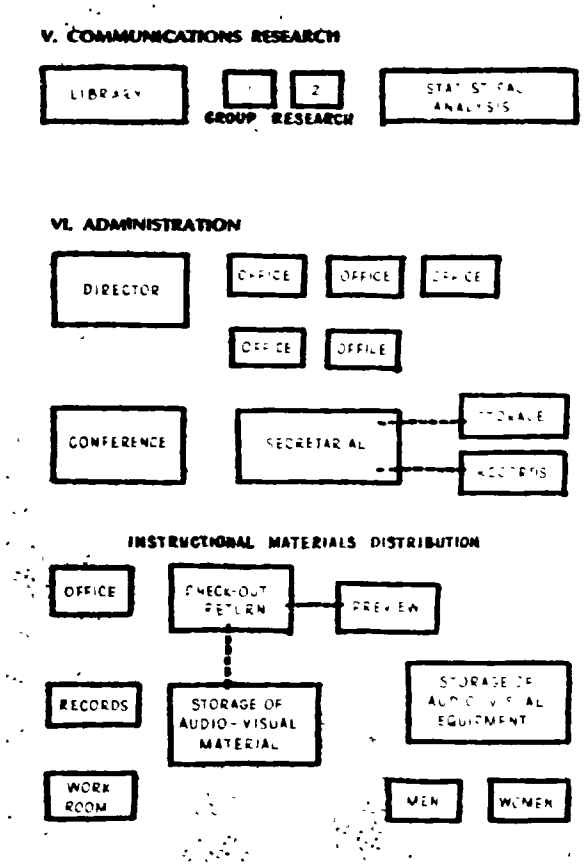
The thinking behind the communications center deserves some attention. It begins with a number of lecture rooms, multidisciplinary in use and each with a variety of display possibilities. These are relatively specialized and complex spaces, and, where a college can afford it, it makes sense to provide them in a new specially-designed facility.

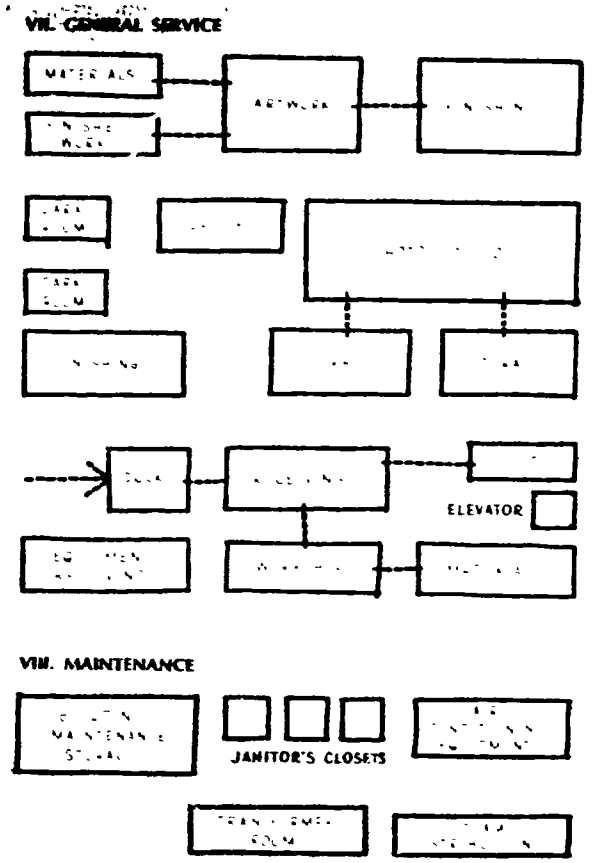
What makes this lecture hall cluster a "communications center", however, is the addition of the media support component. This might include consultation, production, technical dissemination, and evaluation services for the campus-at-large as well as for the rooms in the center.

As can be seen from the outline program developed for Rensselaer's Communications Center, it contains a variety of media-oriented instructional areas from seminar size to 500 seats, support areas for those classrooms, and a "home" for Project Reward (now the Office of Institutional Research). The space program was formulated jointly by the Project staff, the architectural research group, and various faculty members.

Since what was emerging was basically a new campus building type, it appeared logical to promote a design competition to







spark interest and original solutions from the architectural profession. Again, Rensselaer's interested trustee and Educational Facilities Laboratories joined forces to support the development of a more detailed building program, to retain a professional advisor to organize the competition, to attract a half dozen architectural firms, to compensate each entrant, and to award a substantial cash prize to the winner. The architectural program was finalized and issued to the competitors in the summer of 1962, and the judging was held the following winter. The Perkins and Will Partnership of Chicago was adjudged the winner.

At this point in time, Rensselaer's Communications Center is not yet out of the ground. The program has been updated, and as a result of the development of a long range campus plan, the originally-proposed site has been changed. The design has been modified, and the Communications Center now waits in line along with the Library and several other critical buildings for adequate funding.

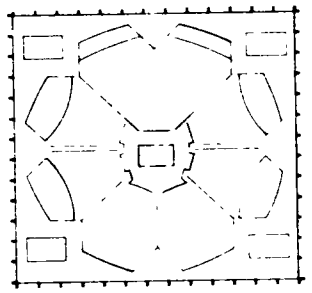
The delay in providing RPI with a Communications Center is no reflection on the value of the project or the thinking behind it. In fact, many colleges have followed the RPI lead. Most notably, the State University of New York is operating, constructing or designing communication and lecture hall centers for 14 of its major campuses. Each represents a different architectural interpretation: some integrate the lecture and support activities, others separate them; some stack activities and spaces vertically, while others spread them horizontally; some place great emphasis on "expressing" the form of the large-group areas, while others integrate them into the campus fabric as a whole.

The communications center idea is more like a concept than a specific building. The notion that large group media-oriented rooms can be grouped together in a multi-disciplinary facility, and that they can be communally supported by a wide range of consultation, production, and evaluation services (as well as technical services) is at the heart of the communications center concept.

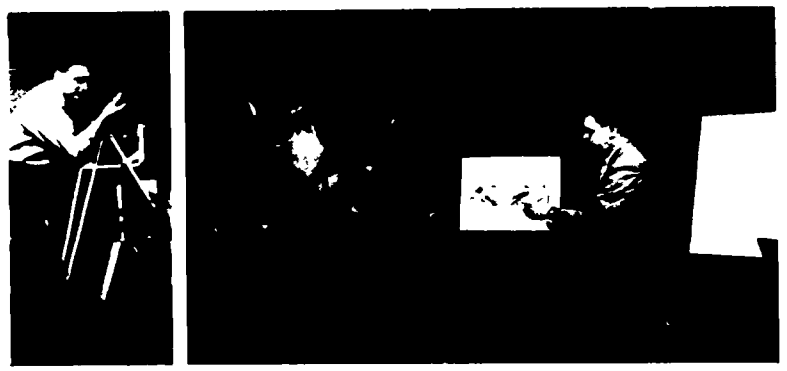
To illustrate an architectural translation of this concept, one new communications center building is presented. Based on a program which incorporated a good deal of Project Reward's philosophy, this center is comprised of three major parts.

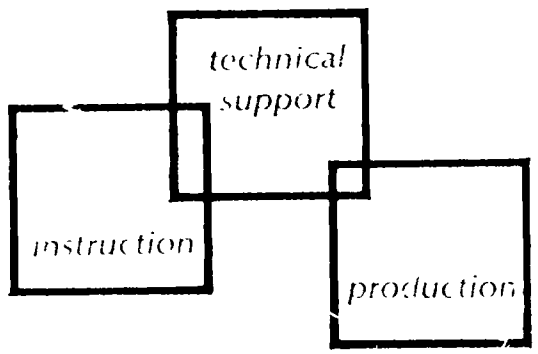
First there are the lecture halls themselves. Ranging in capacity from 60 to 460, each is designed for multi-media presentations. The larger rooms surround a "technical core" — the second major part of the center. This core includes rear projection and technical service areas, as well as preparation space, for the lecture halls. Finally, this technical core is directly connected to the center's ground floor, a floor devoted to housing a comprehensive media program. As can be noted from the plan schematic of this floor, it contains a great many spaces. Some are devoted to office and consultation; others are film and television studio control rooms, production, and storage areas. The activities in these spaces not only serve the lecture halls upstairs, but they are designed to serve the entire campus as well.

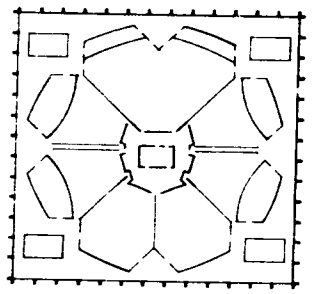
Of course, there are many other ways of physically approaching the concept; this is the way in which architects, Skidmore, Owings, and Merrill chose to handle the problem on the campus of the State University of New York College at Oswego, New York. The building was occupied in the fall of 1967.



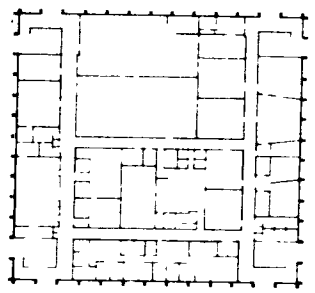
instruction







technical support



production

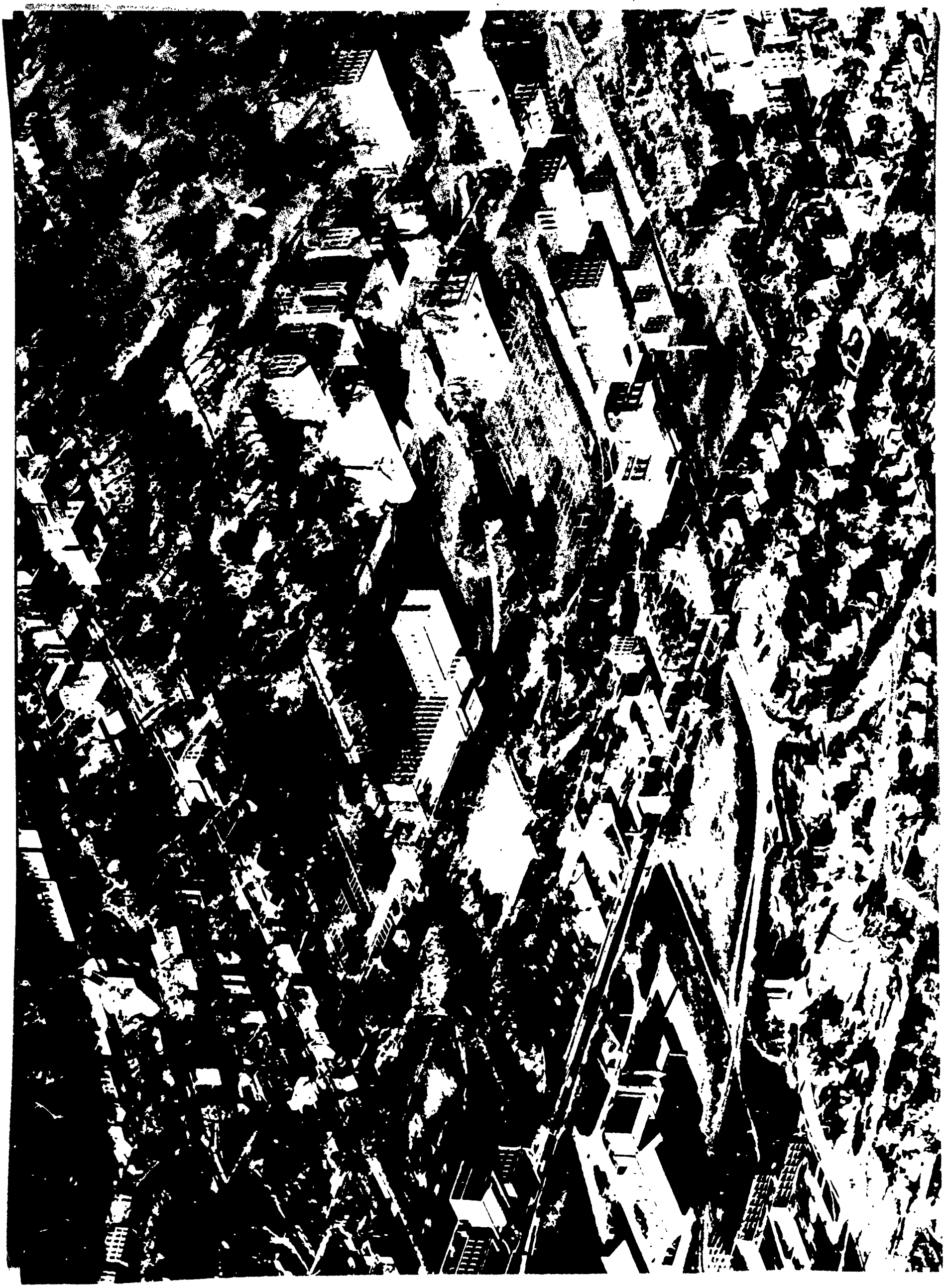
Nor has the philosophy behind the communications center remained static. Once audio-visual support is brought under one roof, the building can become the electronic "nerve center" of the campus, serving other facilities on campus. The tentacles may reach out to groups in classrooms around the campus, to the faculty and administration, or to the student as he studies in the library, in the student union, or even in his dormitory room. If there are other colleges in the region, the communications center may be "plugged in" to them as well.

Project Reward and Long-Range Planning

Project Reward exerted another influence on Rensselaer's facilities, too. Its data collection and analysis activities have become vital inputs in the university's long-range planning picture.

At the same time that data are assembled to determine the costs of instruction, information pertaining to facilities utilization is developed. When combined with facilities inventory and data relating to the instructional program, an accurate picture of facility needs is presented. These data, in turn, form part of the resource bank on which long-range planning decisions must be made.

This campus planning activity has taken such information and projected it into the 1970's to establish physical plant needs. In this way Project Reward's data and interpretations have been used to establish priorities and needs for lecture, classroom, seminar, conference, library, and laboratory facilities, together with other space needs. In the shorter term, the data tell how many student stations in what kind of facility are required immediately and what instructional methods the room must support. While this effort carries little of the drama or excitement associated with the development and mock-up of new facility types, it may have, in the long run, the most lasting effect on Rensselaer's physical plant.



in summary

On the Rensselaer Campus

The challenges faced by the small, private university in the 1960's are tough ones. To say that Rensselaer's Project Reward has met and eliminated them would be something more than an overstatement. Through a determined co-operative effort — a partnership of faculty, administration, architects, and the Project Reward staff — the challenges have been met at Rensselaer. The result has been slow, sturdy — and significant — change.

PROGRAMS: In terms of curriculum and programs, Project Reward made important advances along two fronts: class size and instructional technology. Large groups were introduced in many areas, but not without careful planning, support, and evaluation. Both large and small group classes have been supported by instructional materials and media techniques developed by the Reward staff. Most importantly, many of the university's faculty have taken a "new look" at what they are teaching and how they are teaching it — and when they decide to seek advice or make some changes, the kind of assistance that will make their ideas "work" is forthcoming.

FACILITIES: The Project staff realized very early in their effort that facilities were an integral component of educational change — and did something about it. The careful approach taken to instructional innovation was applied to architectural innovation, too, and each facility created for the effort was a significant improvement on the former one. Subsequent evaluation and dissemination activities have extended the planning guidance developed to the educational and architectural professions as a whole.

PLANNING: Finally, the data gathering and evaluation activities undertaken by the Reward staff have had significant influences on long-range planning at Rensselaer. The need to conserve all resources in the face of rising costs has greatly underscored the need to plan, and Reward's data on both the instructional program and the university's physical plant make that job far more accurate. Also, the true value of planning accuracy cannot be measured in mere dollars and cents.

Beyond the Campus

Project Reward was a homespun activity directed at solving problems at Rensselaer, and no concerted effort was made to influence the development of programs and facilities outside the bounds of the campus. The natural momentum of the Project, however, was bound to carry its influences far beyond Troy.

The reports of instructional experiments and facilities developments have been widely distributed. "Toward More Effective Teaching", a film portraying Project Reward's efforts, has been seen all over the country; and other instructional films, slides, demonstration apparatus, overhead transparencies, and other instructional "tools" have been made available for use in classrooms, lectures, convocations, and presentations of technical papers as well.

"New Spaces for Learning", prepared by the architectural research group and presenting planning guidance for large group media-oriented facilities, was reprinted three times in its original form. In 1966 it was revised and reissued, and total distribution of the report has exceeded 10,000 copies. The EFL report, "New Building on Campus," presents the Communications Center competition, and its 20,000 copies have been widely distributed, too.

Naturally, it is hard to assess the impact of these reports on the programs and facilities of other colleges. It is known that the reports dealing with television, class size, and the overhead projector have been major factors in other colleges deciding to move into the use of such instructional aids. Classrooms and lecture halls similar to those described in "New Spaces" and demonstrated in the Experimental Classroom have appeared in a number of new and proposed buildings around the country. Communications center-type buildings are also appearing on campuses and in the master plans for proposed institutions. Facilities and buildings whose genealogy can be traced directly to the Experimental Classroom and the Communications Center competition are located at Syracuse University, Scarborough College, Queens College, York University, University of Texas, and the University of Sydney. The most notable examples, of course, are the communications centers being built on the 14 State University of New York campuses.

Probably the most direct influence on facilities has come from the many visitors who have come to the Rensselaer campus to see the Experimental Classroom and the remodeled facilities and to talk directly with the staff members of Project Reward and the Center for Architectural Research. Over the past five years it is estimated that 2,000 people have been exposed to the program and its results through the medium of the on-site visit. The follow-up in the form of telephone calls, letters, plan reviews, and other contacts has certainly indicated that these efforts have been directly influential.

For an effort directed initially and specifically toward the Rensselaer campus and its instructional and facility needs, Project Reward has exercised a strong influence on many other colleges and campuses across the country. This report is intended to extend the best of that influence and to help others gain from the Project Reward experience.